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AF 12822#
PATENT APPLICATION

ATTORNEY DOCKET NO. 70990051-3

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Huck-Khim Koay, et al.

Serial No.: 09/888,857

Examiner: Kenelt Pierre

Filing Date: June 25, 2001

Group Art Unit: 2822

Title: Light Source

ASSISTANT COMMISSIONER FOR PATENTS
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on March 19, 2003.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$320.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

() (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

() one month	\$110.00
() two months	\$410.00
() three months	\$930.00
() four months	\$1450.00

() The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 50-1078 the sum of \$320.00. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 50-1078 pursuant to 37 CFR 1.25.

(X) A duplicate copy of this transmittal letter is enclosed.

(X) I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 222313-1450.

Date of Deposit: May 19, 2003 or

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

() Date of Facsimile:

Typed Name: Patricia Flores

Signature: Patricia Flores

Respectfully submitted,

Huck-Khim Koay, et al.

By Herbert R. Schulz

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Date: May 19, 2003



UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

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Examiner: Kenelt Pierre

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11/ Appeal
Brief
6-5-03
A. Wall

Commissioner of Patents and Trademarks
Washington DC 20231

SIR:

This appeal brief is presented on behalf of the Applicants named above.

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REAL PARTY IN INTEREST

The real party in interest is Agilent Technologies, Inc, a Delaware corporation.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1 through 6 were presented for examination. All six claims were rejected by a Final Office Action mailed February 6, 2003. The rejection of all six claims is the subject of this appeal.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

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SUMMARY OF THE INVENTION

The invention provides a light source in the form of a surface-mountable LED assembly [page 5 lines 6-7] that provides a beam of light concentrated in a narrow field of vision [page 3 lines 16-17]. The light source includes a planar substrate [page 5 line 10; Fig. 2a, 210] with an upper surface [page 5 line 12; Fig. 2a, 212] and a lower surface [page 5 line 24], a portion of the upper surface defining a recess [page 5 line 13; Fig. 2a, 220] having a side wall [page 5 line 15; Fig. 2a, 224] tapering outwards towards the upper surface. An LED [page 5 line 18; Fig. 2a, 230] is mounted in the recess of the substrate adjacent the side walls.

A first electrically-conductive interconnect [page 8 lines 15-16 and 18-20 and page 9 lines 1-3; Fig. 8, 800 and 810 and Fig. 12, 820] extends [page 7 lines 12-14; Fig. 5, 420] between the upper and lower surfaces with a terminal [page 5 lines 21-23 and page 10 lines 1-2; Fig. 16, 822] on the upper surface coupled to the LED and an exposed pad [page 5 line 25; Fig. 2a, 250] on the lower surface for coupling to external circuitry. Similarly, a second electrically-conductive interconnect [page 8 lines 15-16 and 18-20 and page 9 lines 1-3; Fig. 8, 800 and 810 and Fig. 12, 820] extends [page 7 lines 12-14; Fig. 5, 425] between the upper and lower surfaces with a terminal [page 5 lines 21-23 and page 10 lines 1-2; Fig. 16, 824] on the upper surface coupled to the LED and a conductive pad [page 5 line 25; Fig. 2a, 252] on the lower surface.

A transparent encapsulated material [page 6 line 3; Figs. 2a and 2c, 260] is bonded to the first surface of the substrate to encapsulate the LED. This material is molded to form an ellipsoidal dome [page 6 line 6]. The ellipsoidal dome may have a major axis equal to the length of the planar substrate and a minor axis equal to the width of the substrate [Figs 2a, 2c, 18].

In some embodiments the side wall of the recess is plated with a metallic layer [page 8 lines 15-16; Fig. 8, 810] presenting a silvered reflective surface [page 9 lines 5-6] to the LED. The substrate defines first and second vias [page 7 lines 12-15; Figs 14 and 20, 420 and 425] with portions of the interconnects extending through the vias [page 8 lines 17-20; Fig. 8, 810] from the upper surface to the lower surface. Each of the

conductive pads of the first and second interconnects may include a gold plated layer [page 9 lines 1-3; Fig. 12, 820].

ISSUES

Are each of claims 1, 2, 3, 4 and 6 patentable over the various combinations of cited references relied on by the Examiner?

GROUPING OF CLAIMS

Claims 1 and 5 stand or fall together.

Claim 2 includes a metallic layer, a feature not present in either of the references over which claim 1 was rejected, and therefore claim 2 stands separately from claim 1.

Claim 3 includes using the metallic layer as an interconnect, a feature not shown in the references over which claim 2 was rejected, and therefore claim 3 stands separately from claim 2.

Claim 4 includes a metallic layer extending through a via, a feature not shown in either of the references over which claim 1 was rejected, and therefore claim 4 stands separately from claim 1.

Claim 6 is directed to an orientation of the ellipsoidal dome, a feature not disclosed or suggested by either of the references over which claim 1 was rejected, and therefore claim 6 stands separately from claim 1.

ARGUMENT

Claims 1 through 6 were presented for examination. In a final office action mailed January 13, 2003 claims 1, 3 and 5 were rejected as unpatentable over U.S. Patent 6,069,440 (Shimizu *et al.*) in view of U.S. Patent 5,777,433 (Lester *et al.*); claim 2 was rejected as unpatentable over Shimizu and Lester in view of U.S. Patent 5,298,768 (Okazaki *et al.*); and claims 4 and 6 were rejected as unpatentable over Shimizu and Lester in view of U.S. Patent 6,045,240 (Hochstein).

Claim 1 is particularly directed to a novel light source having a planar substrate of which a portion of the upper surface defines a recess with a tapered side wall. An LED is mounted in the recess. Two electrically-conductive interconnects extend between the upper and lower surfaces of the substrate, each interconnect with a terminal on the upper surface coupled to the LED and a pad on the lower surface. A transparent encapsulated material forms an ellipsoidal dome over the LED.

The Examiner correctly notes [office action page 4 lines 14-17] that Shimizu *et al.* fail to disclose the following: a planar substrate, first and second interconnects between surfaces of the substrate, and transparent encapsulant. The Examiner then suggests that Lester *et al.* disclose these features [office action page 4, lines 18-20]. But Lester *et al.* show no substrate and no interconnects.

Fig 1 of Lester *et al.* shows an overall view of an LED device in which a chip 12 is supported by a connecting lead 15. This structure is similar to the chip 102 and the connecting lead 105 in Fig. 1 of Shimizu *et al.* Lester *et al.* disclose, not a substrate or interconnects, but a high-refractive-index package material [Lester *et al.* column 1 lines 9-11, and abstract line 1]. Combining Lester *et al.* with Shimizu *et al.*, assuming any motivation to do so, would yield the device as shown in Fig 1 of Shimizu *et al.* with a high-refractive-index package. Indeed, the Examiner concedes as much [office action page 5 lines 1-6] in acknowledging that the combination would yield the LED structure of Shimizu *et al.* encapsulated in the material shown by Lester *et al.* This is not the Applicants' invention as described in claim 1.

Moreover, Applicants respectfully disagree that there would have been any motivation to combine Shimizu *et al.* with Lester *et al.* The Examiner argues that there would have been motivation to combine these references simply because they both pertain to LEDs. There are many patents pertaining to LEDs, but the Applicants respectfully suggest that this by itself does not create any motivation to combine them all.

For the foregoing reasons, it is submitted that claim 1 is allowable over the combination of Shimizu *et al.* and Lester *et al.*

Claims 2, 3 and 5 all depend directly or indirectly from claim 1. It is therefore submitted that claims 2, 3 and 5 are also allowable. But claims 2 and 3 each also raise separate issues.

Claim 2 is directed to a novel light source as described above, and further having a metallic coating on a sloping sidewall. The Examiner would combine Okazaki *et al.* with the references over which claim 1 was rejected. But there would be no motivation to do so. Okazaki *et al.* disclose a different type of structure in which there is a hole 21 through a substrate 4 with different interconnects 18 and 19 applied as plating to opposite sides of the hole. It does not appear that there would be any advantage to making holes in the devices shown by Lester *et al.* or Shimizu *et al.* Applicants respectfully disagree that it would have been obvious to combine these references. But even if such a combination were attempted, it would not result in the invention as described in claim 2. It is therefore submitted that claim 2 is allowable over these references.

Claim 3 is directed to a novel light source as in claim 2 and featuring the unique feature of using the reflecting sidewall as an electrical interconnect. The Examiner says that Shimizu *et al.* show this feature. But in Fig. 2 of Shimizu *et al.* the LED die sits atop the "casing" 204, coplanar with the interconnects. In the invention as claimed, the LED die sits in a recess and uses a reflective metallic coating on the sloping sidewall as a terminal. This feature is not disclosed or suggested by Shimizu *et al.* alone or in combination with Lester *et al.* The Applicants therefore submit that claim 3 is allowable over the cited references.

Claim 4 is directed a novel light source as in claim 1 and featuring vias in the substrate. The electrical interconnects extend through the vias. This claim was rejected as unpatentable over Shimizu *et al.* and Lester *et al.* in view of Hochstein. Hochstein is directed to the problem of heat dissipation in a traffic light having many LEDs as well as incandescent bulbs in the same housing. Applicants respectfully disagree that there would have been any motivation to combine Hochstein with the other references. To the contrary, Shimizu *et al.* and Lester *et al.* are directed to individual LEDs whereas Hochstein is directed to an assembly of many LEDs. Combining these references would require mounting many LEDs of the kind

described by Lester *et al.* and Shimizu *et al.* in the structure described by Hochstein. This would not yield the invention as described in claim 4. Accordingly, it is submitted that claim 4 is allowable over the cited references.


Claim 6 is directed to a novel light source as described in claim 1, and in which the ellipsoidal dome has a major axis equal to the length, and a minor axis equal to the width, of the substrate. None of the references discloses any such structure. Hochstein [Fig 3] shows a plurality of LEDs with some type of cover over them, but there is no indication that there is any ellipsoidal shape. To the contrary, since Hochstein discloses a traffic light assembly, one would expect the assembly to be round, not ellipsoidal. Neither Shimizu *et al.* nor Lester *et al.* teaches an ellipsoidal dome oriented with major axes aligned with a rectangular substrate. Therefore, it is submitted that claim 6 is allowable over the references.

CONCLUSION

The applicants respectfully submit that, for the reasons of fact and law set forth above, the decision of the Examiner in finally rejecting claims 1 through 6 should be reversed.

Respectfully submitted,

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APPENDIX

The claims involved in this appeal are:

1. A light source comprising:

a planar substrate having an upper surface and a lower surface, a portion of the upper surface defining a recess having a side wall tapering outwards towards the upper surface,

a light emitting diode mounted in the recess of the substrate adjacent the side walls,

a first electrically-conductive interconnect extending between the upper and lower surfaces, the first interconnect having a terminal on the upper surface coupled to the light emitting diode and an exposed pad on the lower surface for coupling to external circuitry,

a second electrically-conductive interconnect extending between the upper and lower surfaces, the second interconnect having a terminal on the upper surface coupled to the light emitting diode and a conductive pad on the lower surface for coupling to external circuitry, and

a transparent encapsulated material bonded to the first surface of the substrate to encapsulate the light emitting diode, the material being molded to form an ellipsoidal dome over the light emitting diode.

2. A light source as claimed in Claim 1, wherein the side wall of the recess is plated with a metallic layer presenting a silvered reflective surface to the light emitting diode.

3. A light source as claimed in Claim 2, wherein the metallic layer forms the terminal of the first interconnect.

4. A light source as claimed in Claim 1, wherein the substrate defines first and second vias extending between the upper and lower surfaces, a portion of each of the first and second interconnects extending through the first and second vias respectively.

5. A light source as claimed in Claim 1, wherein each of the conductive pads of the first and second interconnects includes a gold plated layer for electrically coupling to external circuitry.

6. A light source as claimed in Claim 1 wherein the ellipsoidal dome formed by the transparent encapsulant material has a major axis equal to the length of the planar substrate and a minor axis equal to the width of the substrate.